ROTEL®

RA-312

STEREO PRE/MAIN AMPLIFIER

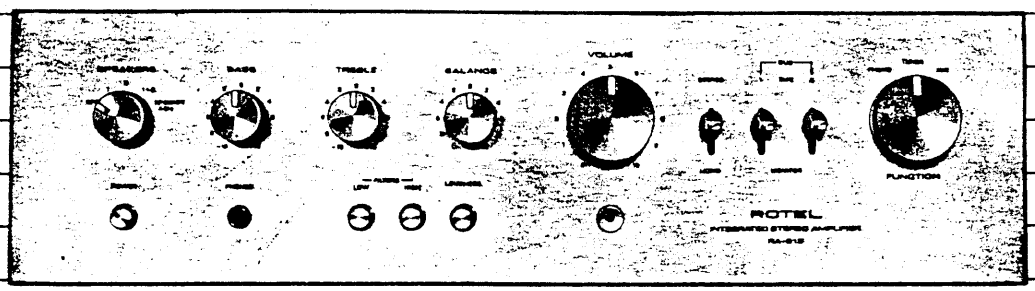


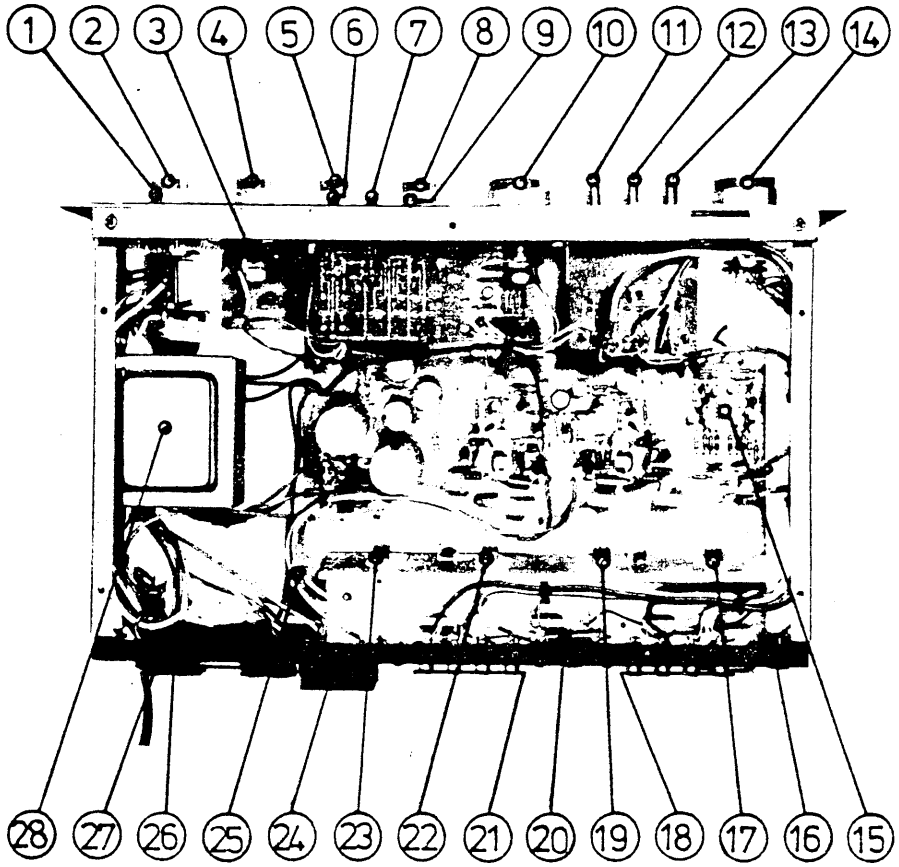
TABLE OF CONTENTS

CHASSIS LAYOUT 1
PRECAUTIONS 1
MAIN AMP. BIAS ADJUSTMENT 2
GAIN DIAGRAM 2
TROUBLE SHOOTING 3
REPAIR PARTS LIST 4
SCHEMATIC DIAGRAM 5
MONITOR CIRCUIT BOARD DIAGRAM ... 6
FILTER CIRCUIT BOARD DIAGRAM 6
PRE/MAIN AMP. & POWER SUPPLY
CIRCUIT BOARD DIAGRAM 7

TECHNICAL MANUAL

CHASSIS LAYOUT

1. S9, Power Switch
2. S2, Speaker Selector
3. Headphone Jack
4. Bass Control
5. Treble Control
6. S6, Loudness Switch
7. S7, High Filter Switch
8. Balance Control
9. S8, Low Filter
10. Volume Control
11. S5, Mode Switch.
12. S4, Tape Moniter-1 Switch.
13. S3, Tape Moniter-2 Switch.
14. S1, Function Selector
15. IC401, Phono Amp. IC.
16. Phono Din Jack
17. Q613, Power Amp. (L-ch)
18. Input Terminal
19. Q611, Power Amp. (L-ch)
20. Tape Monitor Din Jack
21. Tape Monitor Terminal
22. Q612, Power Amp. (R-ch)
23. Q614, Power Amp. (R-ch)
24. Speaker Fuse
25. F901, AC Fuse
26. Speaker Terminal 1 and 2
27. AC Outlet 1 and 2
28. T001, Power Transformer



PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the Transistors.

2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.

3. Replacement for output and driver transistors, if necessary, must be made from the same hfe group as the original type.

4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.

5. When mouting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistors failure.

6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat conduction.

MAIN AMP BIAS ADJUSTMENT

(2)

Instrument: DC Millivolt Meter

1. Rotate Volume Control to Counter-clockwise position (minimum volume).
2. Connect the plus lead of DC millivolt meter to test point 4 ⊕ (on Main Amp. PCB) and mimus lead to test point 2 ⊖ (for Right channel).
3. Adjust VR602 (on Main Amp. PCB) to obtain a 15mV reading on DC millivolt meter (no signal input).
4. Repeat the steps 2 and 3 as above for Left channel (Use test point 3 ⊕ , 1 ⊖ and adjust VR601).

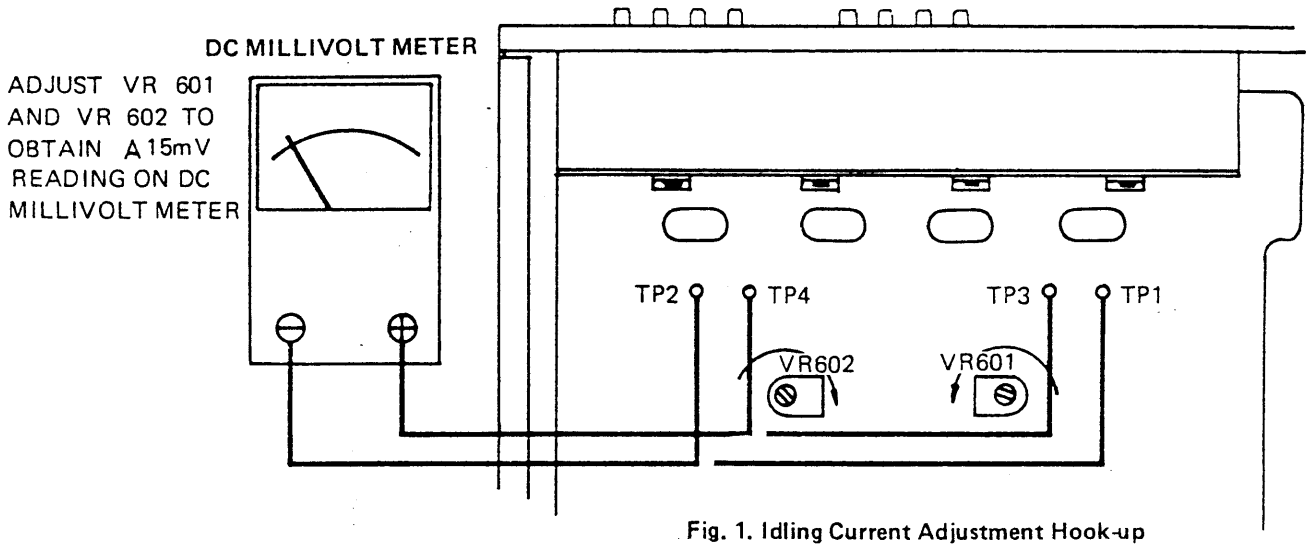
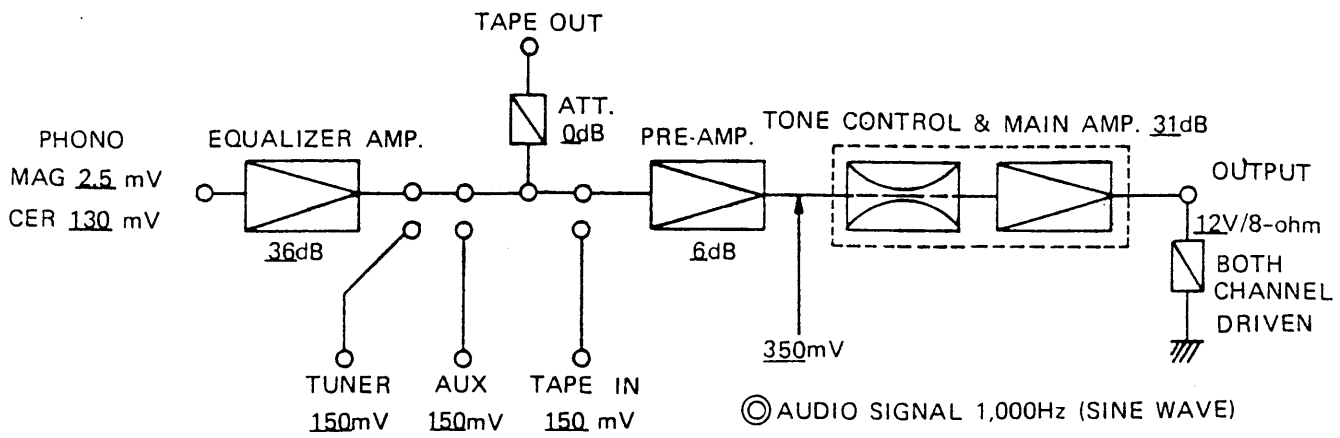


Fig. 1. Idling Current Adjustment Hook-up

GAIN DIAGRAM



TROUBLE SHOOTING

Unit Inoperative

I. If the pilot lamp does not illuminate, check the flow at the AC Outlet and
   A. If no voltage across
      1. The AC cord may be broken, or
      2. Connections in the power switch may be faulty.
   B. If there is proper voltage across check the AC fuse F901 and
      a. If the AC fuse is blown
         1. Rectifier D901, 902, 903 or 904 may be shorted, or
         2. Capacitor C901, 902, 903, 904, 905 or 906 may be shorted, or
         3. Primary, or secondary winding of the power transformer T001 may be shorted.
      b. If the AC fuse is normal.
         1. Secondary winding of the power transformer may be opened.

II. If the pilot lamp does illuminate, measure voltage across +B, −B and B_1 (See schematic diagram) and
   A. If no voltage across
      1. Retifier D901, 902, 903 or 904 may be opened.
   B. If there is proper voltage across, check the speaker fuse and
      a. If the speaker fuse is blown.
         1. Transistor Q611 or 613 (Q612 or 614 for R-ch) may be shorted, or
         2. Transistor Q601, 603, 605, 607 or 609, (Q602, 604, 606, 608 or 610 for R-ch) may be faulty, or
         3. Output circuit (including speaker system) may be shorted, or
         4. The fuse may be worn out.
      b. If the speaker fuse is normal and check the minus − point of C517 (C158 for R-ch)
         i If there is no signal
         1. Transistor Q501 (Q502 for R-ch) may be faulty, or,
         2. Capacitor C503, 505, 509 or 517 (C504, 506, 510, or 518 for R-ch) may be faulty.
         ii. If there is a signal.
         1. Transistor Q601, 603, 605, 607 or 609 (Q602, 604, 606, 608 or 610 for R-ch) may be faulty.

Only PHONO Section Inoperative

A. IC401 may be faulty, or
B. Capacitor C403, 405, or 413 (C404, 406, or 414 for R-ch) may be faulty.

Hum and/or Noise

A. Hum and/or noise produced with Volume Control set at minimum.
   1. Transistor Q501 (Q502 for R-ch) may be faulty, or
   2. Capacitor C503, 505, 509 or 517 (C504, 506, 510 or 518 for R-ch) may be faulty, or
   3. Resister R507, 509 or 511 (R508, 510 or, 512 for R-ch) may be faulty.
B. Hum and/or noise produced only in PHONO −
   1. IC401 may be faulty, or
   2. Capacitor C901, 902, 403 or 413 (C901, 902, 404 or 414 for R-ch) may be faulty.

REPAIR PARTS LIST

Symbol	Parts No.	Description
TRANSISTORS, DIODES AND IC'S		
Q501	301201114	2SC644(S), Flat Amp.
Q502	301201114	2SC644(S), Flat Amp.
Q601	301001133	2SA750(E), Differential Amp.
Q602	301001133	2SA750(E), Differential Amp.
Q603	301001133	2SA750(E), Differential Amp.
Q604	301001133	2SA750(E), Differential Amp.
Q605	301201155	2SC1318(R), Pre-driver
Q606	301201155	2SC1318(R), Pre-driver
Q607	301201132	2SC1384(R), Driver
Q608	301201132	2SC1384(R), Driver
Q609	301001123	2SA684(R), Driver
Q610	301001123	2SA684(R), Driver
Q611	301201142	2SC789(Y), Power Amp.
Q612	301201142	2SC789(Y), Power Amp.
Q613	301201142	2SC789(Y), Power Amp.
Q614	301201142	2SC789(Y), Power Amp.
D601	300212006	SV-04, Temperature Compensator
D602	300212006	SV-04, Temperature Compensator
D603	300919021	SU-1-02, DC Balance Regurator
D901	300919017	Hi-Fi SPECIAL, Rectifier
D902	300919017	Hi-Fi SPECIAL, Rectifier
D903	300919017	Hi-Fi SPECIAL, Rectifier
D904	300919017	Hi-Fi SPECIAL, Rectifier
IC401	303452152	RC-4558(DN), Phono Equalizer Amp.
VARIABLE RESISTORS		
VR501	515121120	250KW, Balance Control
VR502	525121129	100KBX2, Volume Control
VR503	525101128	50KBX2, Treble Control
VR504	525101128	50KBX2, Bass Control
VR601	510502126	10KB, Idling Current Adj. (L-ch)
VR602	510502126	10KB, Idling Current Adj. (R-ch)

Symbol	Parts No.	Description
OTHERS		
S1	601011268	Switch, Function Selector
S2	601011264	Switch, Speaker Selector
S3	611001636	Switch, Tape Monitor-2
S4	1Set	Switch, Tape Monitor-1
S5		Switch, Mode
S6	614030811	Switch, Londness
S7	1Set	Switch, High Filter
S8		Switch, Low Filter
S9	614010107	Switch, Power Supply
F901	341220015	Fuse, 1.5A(line 100V or 120V)
	341220010	Fuse, 1A (line 220V or 240V)
F001	341220025	Fuse, 2.5A (Speaker)
F002	341220025	Fuse, 2.5A (Speaker)
PL001	351140005	Lamp, 14V, 50mA
L601	228641105	Anti-Parasitic
L602	228641105	Anti-Parasitic
T001	205001388	Transformer, Power Supply (Multi-Voltage Type)
	204001388	Transformer, Power Supply (Line 100V or 120V)
	206001388	Transformer, Power Supply (Line 220V or 240V)
	141610276	Pre/Main Amp. Circuit Board Assembly (without Power Transistors and Heat Sink)
	141710276	Monitor Circuit Assembly "TC-115-ST"
	141710275	Filter Circuit Assembly "TC-114-ST"

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ROTEL OF AMERICA, INC. 2642 CENTRAL PARK AVE., YONKERS, N.Y. 10710, U.S.A.

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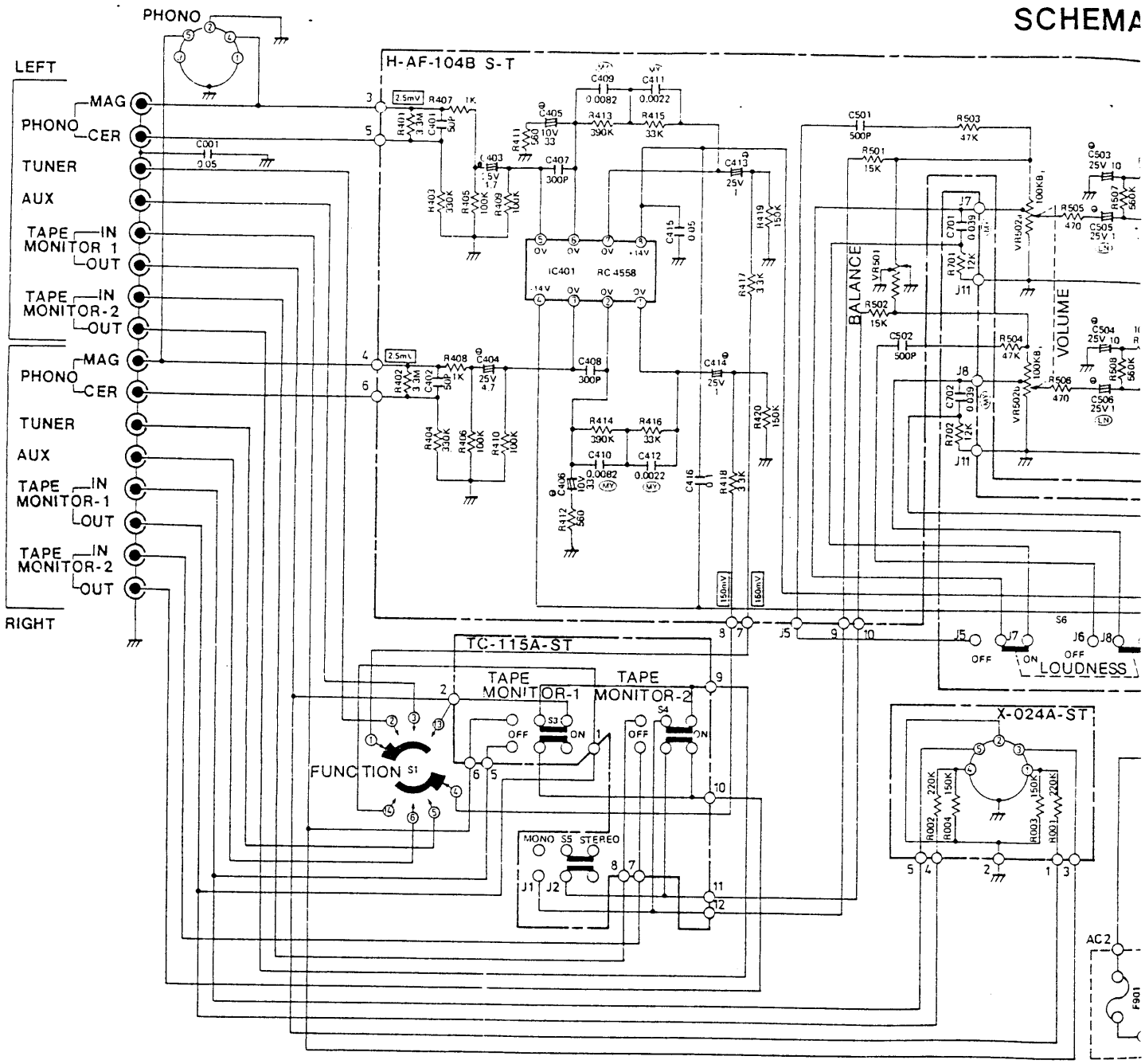
SCHEMA



ITEM	SCHEMATIC LOCATION (LAST)
EQUALIZER AMP.	R420
	C419
TONE CONTROL AMP.	R524
	C519
TONE CONTROL AMP.	R704
	C706
MAIN AMP.	R633
	C617
POWER SUPPLY	R906
	C908
CHASSIS	R007
	C003

RESISTORS

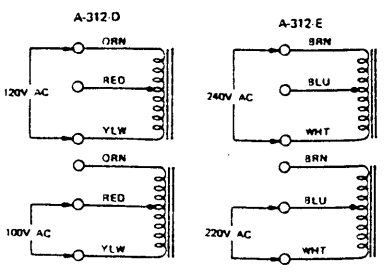
5% TOLERACE UNLESS OTHERWISE NOTED
K · · KILO OHM
M · · MEGA OHM
• · · · COMPOSITION RESISTORS ½ WATT
NON MARK · · · · LOW NOISE TYPE CARBON RESISTOR ¼ WATT

CAPACITORS

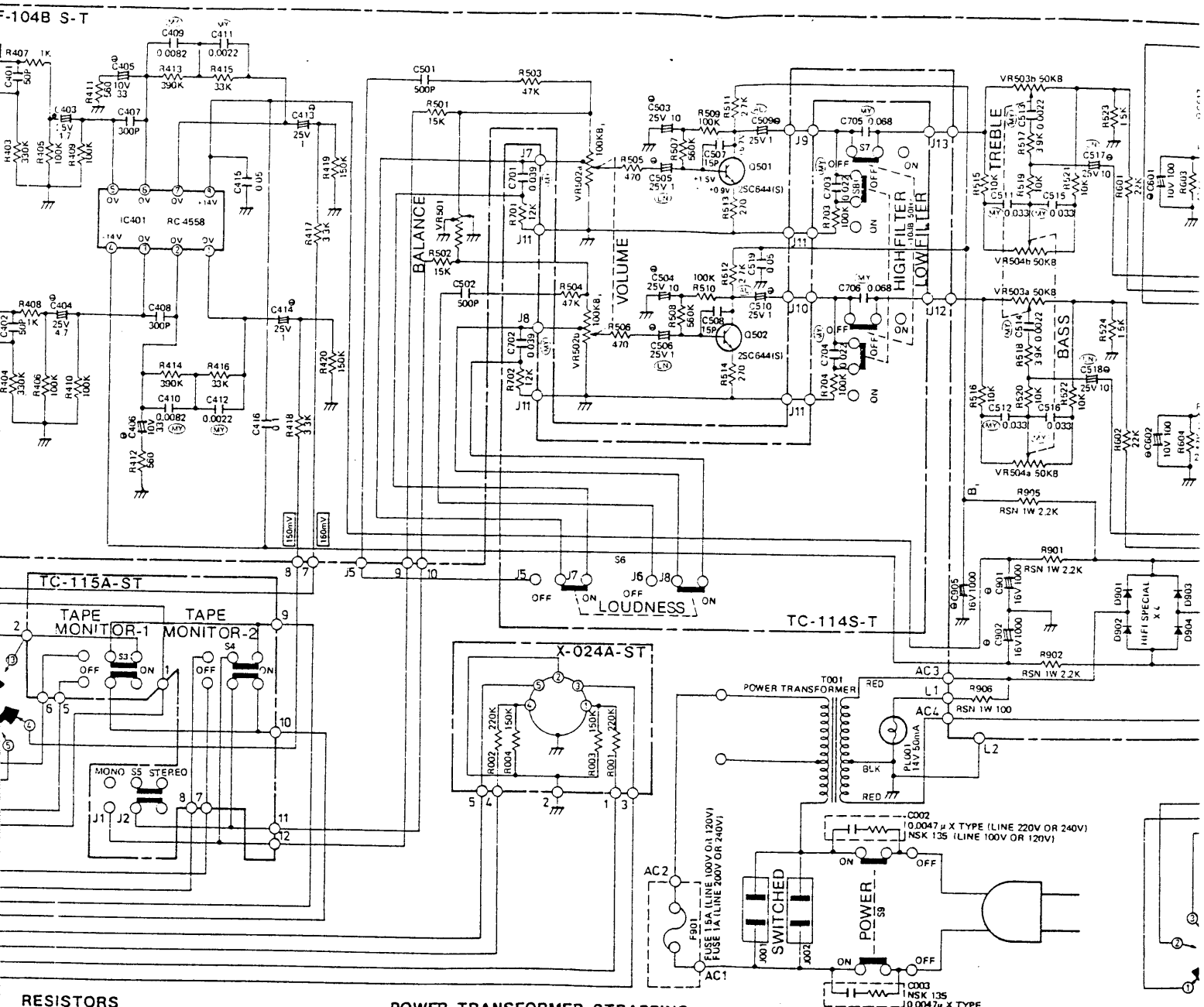
(MY) · · · · MYLAR FILM CAPACITORS
⊣⊢ · · · · ELECTROLYTIC CAPACITORS
(LN) · · · · LOW NOISE TYPE ELECTROLYTIC CAPACITORS
(AL) · · · · ALUMINUM CAPACITORS
NON MARK · · · · CERAMIC CAPACITORS

- UNLESS OTHER WISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD
- VOTAGE READING MAY VART ±20%
- ▭ INDICATES 1KHz SIGNAL LEVELS FROM PHONO INPUT: 2.5mV To PA. OUTPUT: 12V ACROSS 8-ohm LOARD

POWER TRANSFORMER STRAPPING



SCHEMATIC DIAGRAM



RESISTORS

5% TOLERACE UNLESS OTHERWISE NOTED
K · · KILO OHM
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CAPACITORS

(MY) · · · · MYLAR FILM CAPACITORS
⊣⊢ · · · · ELECTROLYTIC CAPACITORS
(NZ) · · · · LOW NOISE TYPE ELECTROLYTIC CAPACITORS
(AL) · · · · ALUMINUM CAPACITORS
NON MARK · · · · CERAMIC CAPACITORS
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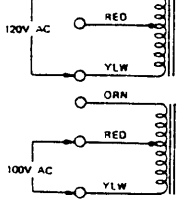
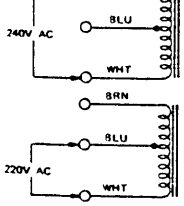
POWER TRANSFORMER STRAPPING

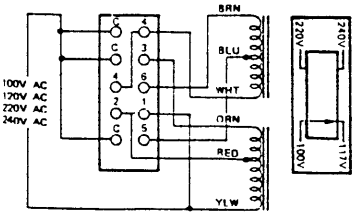
A-312-D



A-312-E



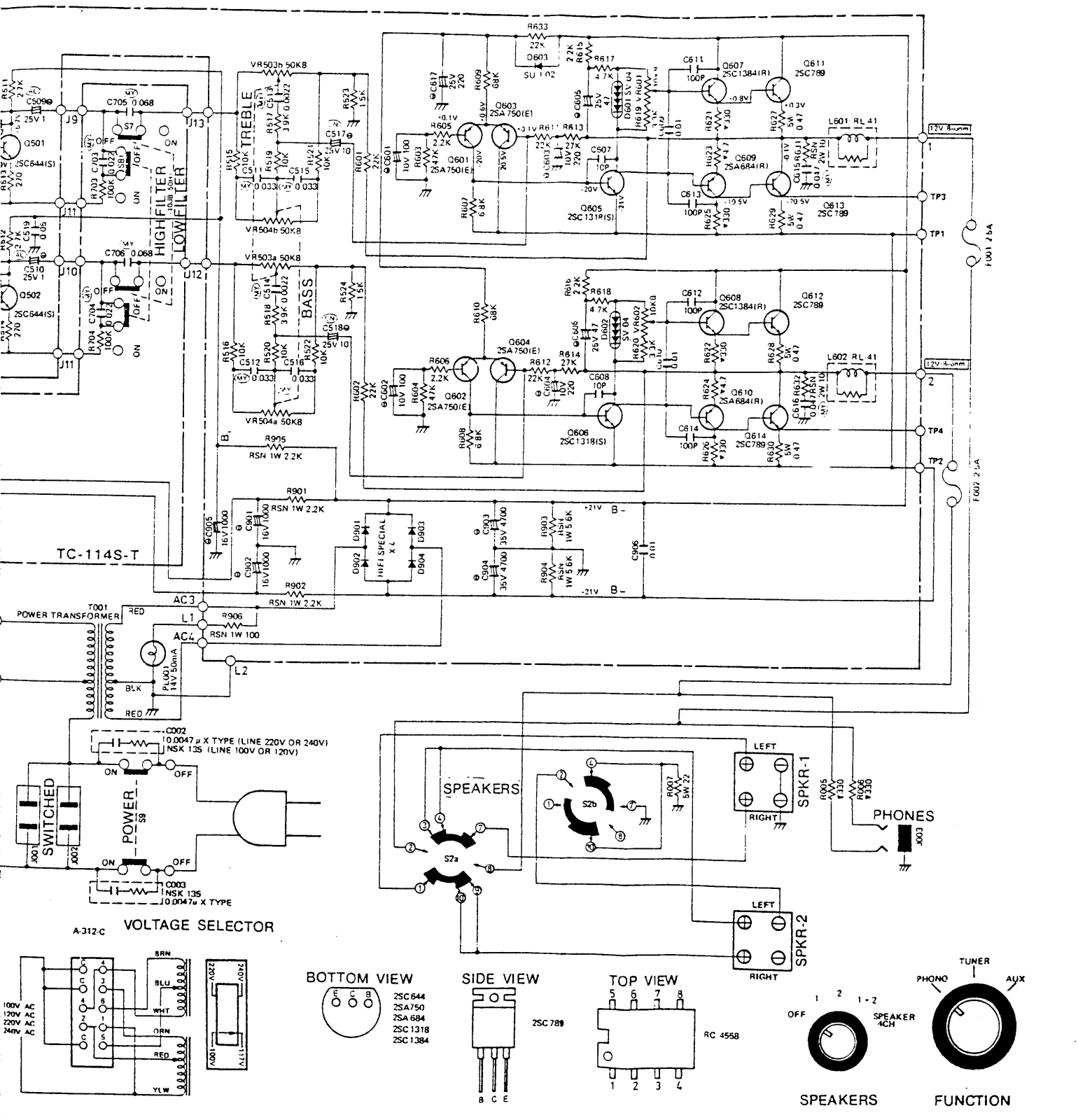
A-312-C VOLTAGE SELECTOR



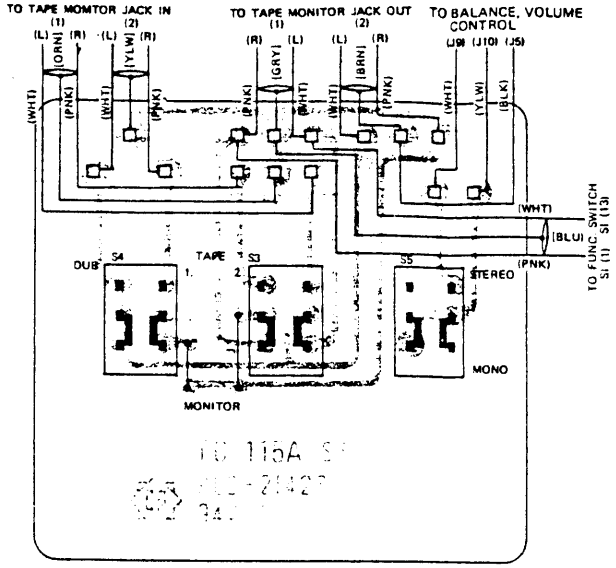
BOTTOM VIEW

2SC644
2SA750
2SA684
2SC1318
2SC1384

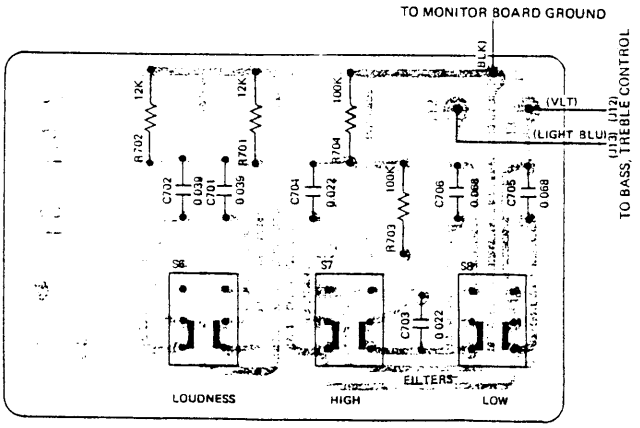
TIC DIAGRAM

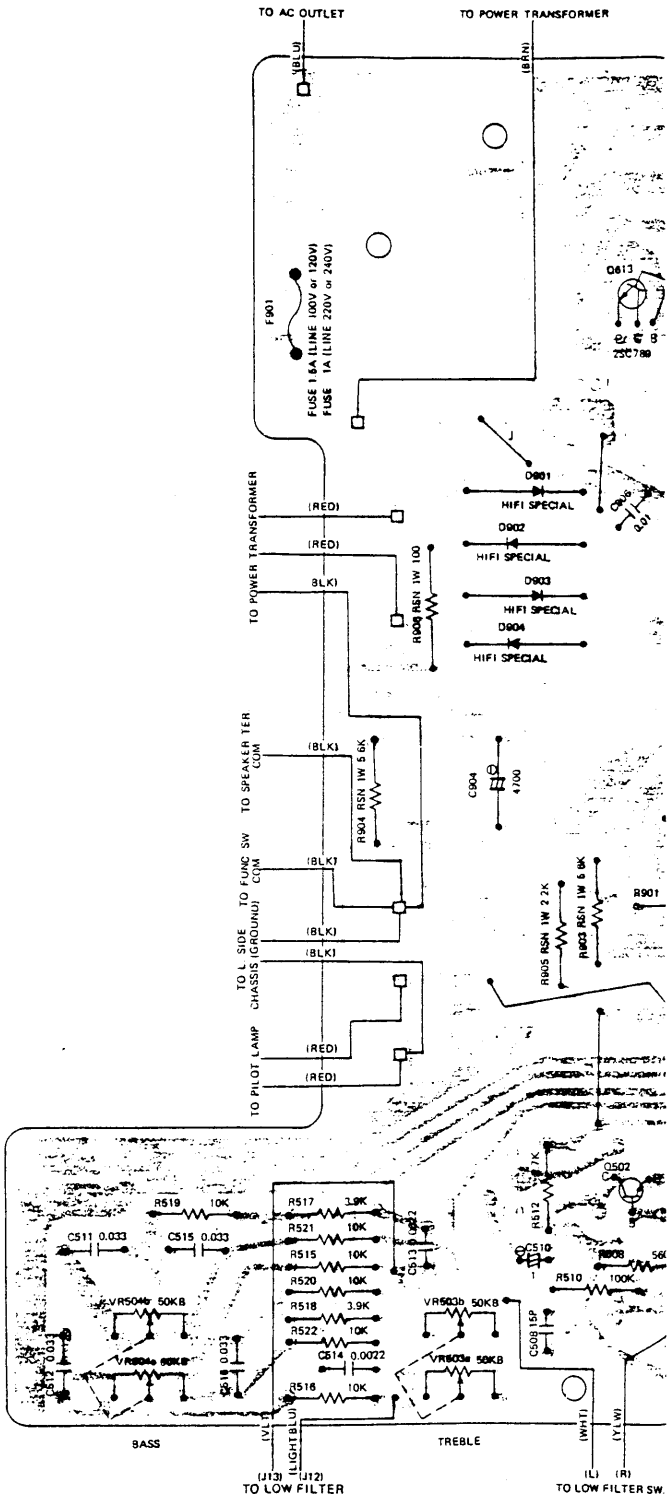

TC-114S-T
POWER TRANSFORMER
VOLTAGE SELECTOR
SWITCHED POWER
SPEAKERS
PHONES
LEFT
RIGHT
SPKR-1
SPKR-2
TREBLE
BASS
HIGH FILTER
LOW FILTER
BOTTOM VIEW
SIDE VIEW
TOP VIEW
2SC644
2SA750
2SA684
2SC1318
2SC1384
2SC789
RC 4558
SPEAKERS
FUNCTION
TUNER
PHONO
AUX
OFF
SPEAKER 4CH

MONITOR CIRCUIT DIAGRAM (6)



FILTER CIRCUIT DIAGRAM





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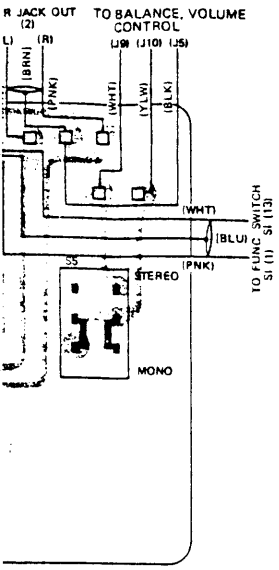

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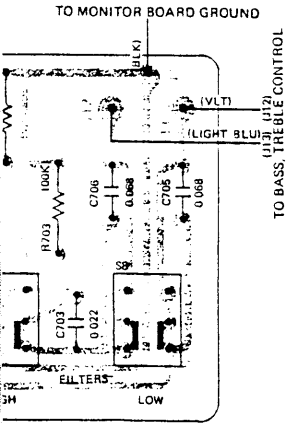
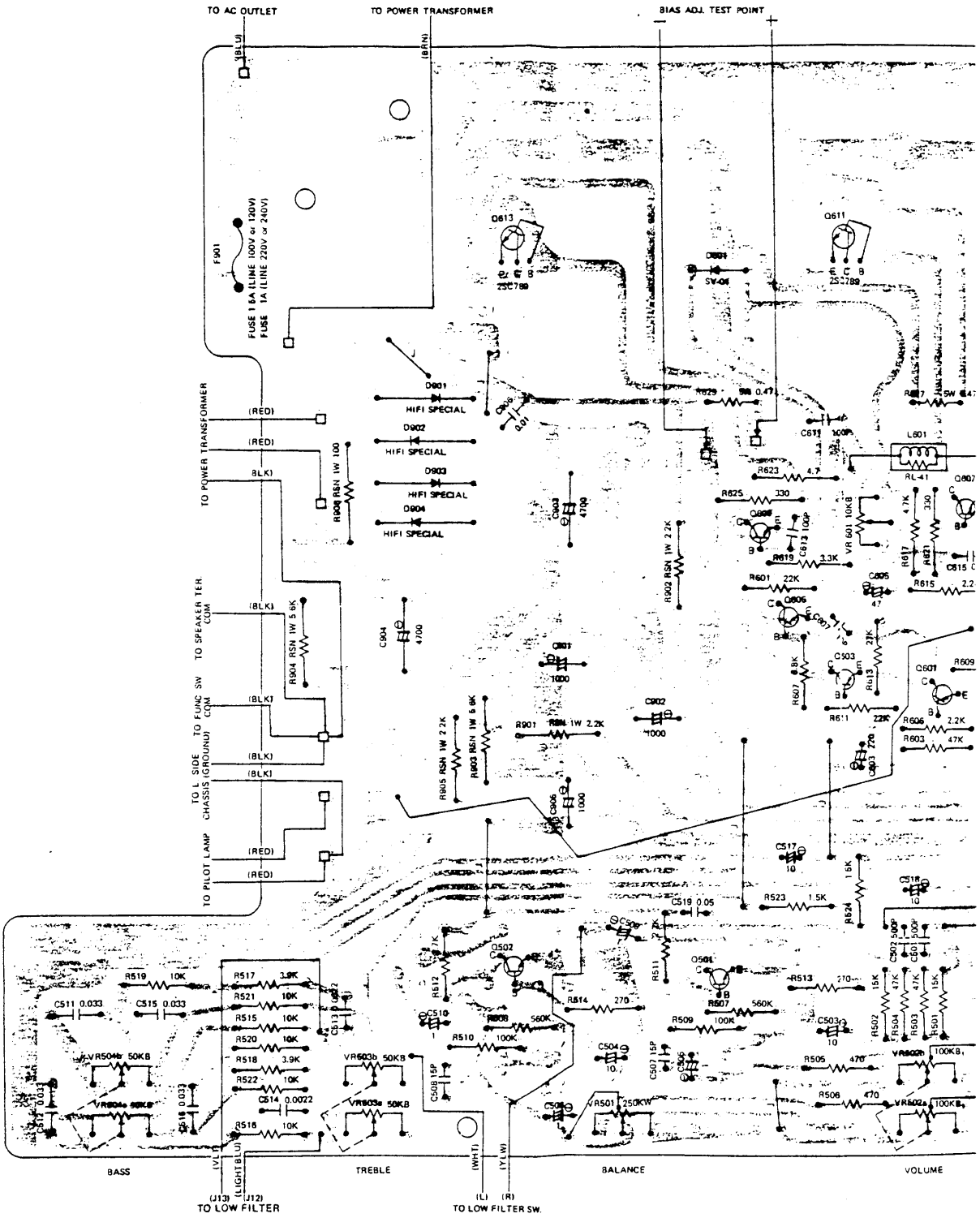


PRE/MAIN AMP. C



PRE/MAIN AMP. CIRCUIT BOARD DIAGRAM